

Does Pelvic Incidence and Sacral Morphology Differ in Patients With Lateral Compression Pelvic Ring and U-Shaped Sacral Fractures?

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Purpose: Lateral compression (LC1) and U-shaped sacral (SU) fractures are common in elderly patients. We have noticed steep inlet views for patients with SU fractures in comparison to patients with LC1 fractures. This can make accurate fluoroscopic imaging difficult to obtain. We sought to evaluate pelvic incidence (PI), fracture type, and radiographic pelvic morphology between patients with SU and LC1 pelvic ring injuries from low-energy mechanisms.

Methods: The study was a retrospective chart review. We included adult patients who sustained either an LC1 or SU pelvic ring injury after a ground level fall. We excluded patients with injuries from a high-energy mechanism. We collected demographic data as well as radiographic data, which included PI, sacral slope, sacral dysmorphism, S1/S2 inlet and outlet measurements, degree of kyphosis, and if surgical fixation was performed. We then compared these values between LC1 pelvic ring injuries and SU fractures.

Results: 100 total patients were included (50 LC1, 50 SU). LC1 patients were older (80.7 vs 73.5, $P = 0.002$), had higher PI (75.6° vs 66.9°, $P = 0.001$) and S1 inlet measurements (18.9° vs 10.9°, $P = 0.001$). SU fractures had higher S1 outlet (72.0° vs 52.5°, $P = 0.001$), greater S1-2 inlet change (16.5° vs 11.6°, $P = 0.012$), higher rates of zone 2 fractures (20% vs 2.5%), and increased rates of surgical intervention (92% vs 12.5%). There was no significant difference in body mass index ($P = 0.35$), sacral slope ($P = 0.08$), S2 inlet ($P = 0.304$), S2 outlet ($P = 0.039$), combined outlet ($P = 0.523$), sacral kyphosis ($P = 0.363$), and rates of sacral dysmorphism (42.5% in both).

Conclusion: We found differences in sacral morphology between patients who sustained LC1 and SU fractures after a ground level fall. Most notable was that SU fractures had a more flat S1 sacral body and lower pelvic incidence, which can make the outlet view more difficult to obtain. The increased difference between the S1/S2 inlet views will also make accurate inlet views more challenging in this group. This information can be taken into consideration when treating these fracture patterns to help ensure safe iliosacral screw placement.